

**REMARKS/ARGUMENTS**

Claims 1-20 are currently pending in the application. Claims 1, 6-10, 13-20 and the specification at paragraphs [0013] and [0045] have been amended to correct informalities. These amendments introduce no new matter into the application.

**Claim Rejections: 35 U.S.C. §102 and 103**

The Action rejected claims 1-20 under 35 U.S.C. §102(a) as anticipated by, or in the alternative, under 35 U.S.C. §103(b) as obvious over U.S. Patent No. 6,255,551 to Shapiro et al. ("Shapiro").

Claim 1 recites:

An electrokinetic method for at least one of groundwater protection, soil remediation or soil engineering which comprises applying an electric field between iron-rich sacrificial electrodes, which are implanted in an area of water-bearing soil, sediment or slurry so as to generate an abrupt pH and Eh gradient from acid to alkaline conditions, with the spontaneous *in situ* precipitation of a stable iron-rich band occurring at the boundary between the acid and alkaline zones.

Shapiro teaches a method of electrokinetically treating soil by applying an electric field and then introducing sulfide salts into contaminated media. See col. 5, lines 28-32. A portion of the sulfide salts react with contaminants, while another portion reacts with iron in the soil to precipitate ferrous-sulfides, forming a ferrous-

sulfide zone to contain any remaining contaminants in the media. See col 5, lines 33-51.

In rejecting the claims under 35 U.S.C. §102(b), the Action holds that, “[Shapiro] does not disclose that the electrokinetic method generates an abrupt pH and Eh gradient as claimed. The gradients as claimed would have been inherently formed by the application of current between two electrodes placed within the groundwater containing soils.” Contrary to this assertion, the pH and Eh gradients would not inherently form during the use of Shapiro’s method, because Shapiro’s electrodes include carbon, in addition to iron. Carbon is a corrosion resistant material, and provides pH buffering. See Col. 9 lines 27-28 (“The carbon in the electrodes aid in pH buffering of the electrokinetic process”). Shapiro therefore teaches the opposite of forming a pH and Eh gradient, and cannot be said to anticipate Applicants’ claims.

Regarding the alternative claim rejections under 35 U.S.C. §103(a), Shapiro further fails to suggest the step of generating an abrupt pH or Eh gradient, as is required by Applicants’ claims. Shapiro actually teaches away from such a step by teaching the use of carbon electrodes, as discussed above.

Applicants’ method is advantageous over the referenced prior art because it avoids the use of harmful soil additives. This objective is clearly explained in the specification. See paragraph [0027], line 8 (“...does not involve the use of potentially

toxic conditioning solutions...”). Furthermore, while Shapiro’s method forms a ferrous sulfide barrier zone (see col. 3, lines 61-65), Applicants’ claimed method results in a discrete, stable, coherent iron-rich band which can be excavated as a coherent mass.

Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art generate a pH and Eh gradient in order to initiate precipitation of an iron rich barrier. As stated at paragraph [0023], lines 14-16 of the specification, “[w]here sufficient iron is present in system, spontaneous precipitation of insoluble metal (mainly iron) hydroxides and oxides occurs at the point of this pH ‘jump.’” Formation of the pH and Eh gradients is essential to Applicants’ method because it permits development of a stable iron rich band without the use of additives that can further contaminate the soil. In contrast, Shapiro teaches buffering and the use of additives.

Each of the remaining claims depends from claim 1 and should be patentable over the prior art for at least the reasons discussed above with respect to claim 1.

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**Application No.:** 10/528,629

**Conclusion**

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

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